**PATENT** **Docket No. RSW920010023US1**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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| INVENTORS: | **Brian L. Brinker**<br>**Brad Hansen** | Examiner: L. Wong |
| | | Art Unit: 2167 |
| APPLICATION NO. | **09/864,719** | |
| FILED: | **May 24, 2001** | |
| TITLE: | **METHOD AND SYSTEM FOR SYSTEMATICALLY DIAGNOSING DATA PROBLEMS IN A DATABASE** | |

**CERTIFICATE OF MAILING**

I hereby certify that this paper is being deposited with the U.S. Postal Service as First Class Mail, postage prepaid, in an envelope addressed to Commissioner for Patents, MAIL STOP APPEAL BRIEF-PATENTS, P.O. Box 1450, Alexandria, VA 22313-1450, Attention: Board of Patent Appeals and Interferences on June 1, 2005.

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**Attention: Board of Patent Appeals and Interferences**

**APPELLANTS' BRIEF**

This brief is in furtherance of the Notice of Appeal filed in this case on March 28, 2005. The Commissioner is hereby authorized to charge the fee for filing this Appeal Brief ($500) to Deposit Account No. 09-0457.

This brief is transmitted in triplicate.

## 1. REAL PARTY IN INTEREST

The present application is assigned to International Business Machines Corporation, having its principal place of business at New Orchard Road, Armonk, New York 10504. Accordingly, International Business Machines Corporation is the real party in interest.

## 2. RELATED APPEALS AND INTERFERENCES

The appellant, assignee, and the legal representatives of both are unaware of any other appeal or interference which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

## 3. STATUS OF CLAIMS

A. Claims canceled: 3, 10, 18

B. Claims withdrawn from consideration but not canceled: None

C. Claims pending: 1, 2, 4-9, 11-17, 19, 20

D. Claims allowed: none

E. Claims rejected: 1, 2, 4-9, 11-17, 19, 20

F. Claims appealed: 1, 2, 4-9, 11-17, 19, 20

Appealed claims 1, 2, 4-9, 11-17, 19 and 20 as currently pending are attached as Appendix A hereto.

## 4. STATUS OF AMENDMENTS

A Reply under 37 C.F.R. §1.111 was filed on June 21, 2004; claim amendments were made. In response, the Examiner issued the final Office Action appealed herein. No amendment was filed subsequent to the final rejection.

A Notice of Appeal was filed on March 28, 2005

## 5. SUMMARY OF THE CLAIMED SUBJECT MATTER

Independent claim 1 defines a method of systematically diagnosing data problems in a database, comprising the steps of: identifying a set of tests to be performed on the database *(page 11, lines 26-28; Figure 3, step S2)*; preparing a test program corresponding to the set of tests using SQL (Structured Query Language), wherein the preparing step is implemented using WITH and OUTER JOIN commands of SQL *(page 11, line 28 to page 12, line 2; Figure 3, step S4)*; executing the test program on the database so that the set of tests are performed on the database simultaneously *(page 12, lines 6-8; Figure 3, step S6)*; and automatically providing results of the test program in a predetermined format, whereby data problems in the data base can be diagnosed by viewing the results *(page 12, lines 7-11; Figure 3, step S8)*.

Independent claim 8 defines a system for systematically diagnosing data problems in a database, comprising: a database including a plurality of tables, each

table containing at least one row of data, each row identifiable by one or a combination of key values *(page 4, line 12 to page 5, line 2; Figure 1, items 10, 12, 14)*; and a testing module, coupled to the database, for storing a test program written in SQL (Structured Query Language), wherein the test program includes WITH and OUTER JOIN commands of SQL, executing the test program on the database, and automatically providing results of the test program in a predetermined format, wherein the test program corresponds to a collection of tests for diagnosing data problems in the database *(page 2, line 3 to page 6, line 7; Figure 1, item 20)*.

Independent claim 16 defines a computer program product embodied on computer readable media readable by a computing device, for systematically diagnosing data problems in a database, the product comprising computer executable instructions for: identifying a set of tests to be performed on the database *(page 11, lines 26-28; Figure 3, step S2)*; preparing a test program corresponding to the set of tests using SQL (structured query language), wherein the preparing instructions are performed using WITH and OUTER JOIN commands of SQL *(page 11, line 28 to page 12, line 2; Figure 3, step S4)*; executing the test program on the database so that the set of tests are performed on the database simultaneously *(page 12, lines 6-8; Figure 3, step S6)*; and automatically providing results of the test program in a predetermined format, whereby data problems in the data base can be diagnosed systematically *(page 12, lines 7-11; Figure 3, step S8)*.

The present invention provides a method and system for diagnosing data problems in a database. The system provides a test program for running simultaneously a series of tests on the data base. In the test program, a set of queries corresponding to the series of tests are defined. Then these queries are defined as fields of a larger query, such that the test results appear merely as small tables. Combining the use of the SQL commands "WITH" and "LEFT OUTER JOIN" in a novel and non-obvious manner, the multiple tests can be implemented in the larger query and displayed in a single table. This enables an operator to diagnose easily the nature and location of data problems in the database.

## 6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Applicant respectfully requests the Board to review the rejection of claims 1, 2, 4-6, 8, 9, 11-14, 16, 17, and 19 under 35 U.S.C. §103(a) based on Amado (U.S. Patent No. 5,701,400) in view of Miller et al. (U.S. Patent No. 6,553,366).

## 7. ARGUMENT

### A. The Examiner has not Established a *prima facie* Case of Obviousness

As set forth in the MPEP:

> To establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skilled in the art, to modify the reference or to combine reference teachings.
> MPEP 2143

The Examiner has not met this burden. The present invention provides a simple, novel, and non-obvious method and system for assisting a database administrator, for example, in the performance of his or her administrative functions. More specifically, the present invention utilizes SQL, a programming language with which database administrators are familiar, in a unique way that simplifies the identification of problems within a database.

In the past, conventionally, when the integrity of data stored in a database was questioned, the database administrator (DBA) attempted to diagnose the nature of the problem and/or the exact location of the problem using one of the standard SQL statements known as "SELECT." A SELECT statement is an SQL command for retrieving data from one or more tables of the database. Without knowing the exact nature or location of the data problem in the database, the DBA had to speculate on where the problem might lie and use the SELECT statement to retrieve data from the potential problem areas of the database. The DBA compared the retrieved data with some source to determine whether inaccurate or inconsistent data were stored in the database, and whether any data was missing from a particular location in the database. This process was repeated until the DBA could diagnose properly the data problem in the database. As a result, the conventional process of diagnosing data problems in the database was extremely time consuming and inefficient. Furthermore, the DBA had to keep track of any data retrieved during this process and manually compare data sets to

determine the exact nature and/or location of the data problem. This also was tedious and prone to human error.

The applicant identified a need for an improved technique by which data integrity problems or other problems in a database could be diagnosed more quickly and more systematically. Applicant has done so by using the novel combination of the SQL "WITH" command with the SQL command "LEFT OUTER JOIN" as described in the specification. More particularly, the system of the present invention provides a test program for running simultaneously a set of tests on a database. In the test program, these tests are defined as queries. Then these queries are refined as parts of a larger query in a particular manner, such that the outcome of the queries (test results) appears merely as fields (columns) of tables. This technique is implemented using a new SQL command, "WITH", which is defined in the SQL 1999 Standard set by ANSI/ISO (American Standards Institute / International Standards Organization). Then these fields of tables are queried again by using a well known SQL command "LEFT OUTER JOIN" on all key fields in the database to form a larger table, so that the results from the different tests can be displayed in one outcome table.

By simply running the test program and viewing the outcome table showing all the test results, an operator is able to diagnose easily the nature and location of the data problem(s) in the database. This is made possible using the novel and non-obvious combination of known SQL commands.

In accordance with the present invention, the database administrator or other operator of the testing system identifies multiple tests to be performed. Then, using the

WITH command of SQL, these multiple tests are essentially linked as a single "query", thereby enabling a single query to be utilized to run multiple tests at the same time. To simplify the display of the results of this multiple testing process, the SQL command OUTER JOIN is utilized so that the results are displayed in a manner enabling the database administrator or other user of the test program to quickly identify which of the tables within the database have passed each test and which have failed each test. The results are aligned such that each test represents a column in the table displayed by the system and each table under test is displayed having either a pass or a fail result with respect to that test (reference Figure 2 of the present application).

**The Amado Patent**

U.S. Patent No. 5,701,400 to Amado ("Amado") teaches a system for applying artificial intelligence technology to data stored in databases. Diagnostics are generated that are user-definable interpretations of information in the database. The Examiner relies on Amado for the following asserted teachings:

(A) the identification of a set of tests to be performed on a database (referring to Figures 4 and 12 and column 38, lines 12-29);

(B) the preparation of a test program corresponding to the set of identified tests using SQL (referring to column 11, lines 56-57);

(C) the execution of the test program on the database so that the set of tests are performed on the database simultaneously (referring to column 39, lines 1-5);

(D) automatically providing the results of the test program in a predetermined format so that data problems in a database can be diagnosed by reviewing the results (referring to column 39, lines 16-29); and

(E) the implementation of a preparing step using the WITH command (referring to column 74, lines 34-38).

Nothing in Amado teaches or suggests such capability. Applicant acknowledges that Amado uses the term "SQL" in its text; Amado indicates that it is "likely" that SQL "will be available as the standard interface language" for use with the invention of Amado. Applicant does not purport to have invented the use of SQL in computer processing. However, applicant has made a unique use of certain of the SQL commands to enable a user of the system of the present invention to achieve an ease of use unavailable by prior art systems.

The Examiner appears to rely upon Amado for an alleged teaching of the use of the WITH command of SQL to prepare a series of test to be performed simultaneously. Again, applicant does not claim to have invented the process of performing multiple tests simultaneously, nor does Amado mention the use of the WITH command in column 74. However, applicant has identified the WITH command of SQL as being particularly useful for this process, and in combination with the OUTER JOIN command as claimed, provides a simple way for testing of the database and display of the results

in a user-friendly manner. Nothing in Amado teaches or suggests these features. Amado is a relatively large patent that contains over 100 columns and it appears that the Examiner has selectively searched this document for certain words that correspond to key words utilized in the present claims. However, their existence in the text of Amado notwithstanding, it is inappropriate for the Examiner to make a rejection without applying it in context to the claimed invention.

**The Miller Patent**

U.S. Patent No. 6,553,366 to Miller et al. ("Miller") teaches a method, apparatus, and article of manufacture for performing data mining applications in a relational database management system. The Examiner relies on Miller for an asserted teaching of the use of the OUTER JOIN command to provide a display in which all rows for all key column values are displayed and any missing values from other tables are filled with null values.

The addition of Miller does not render the present invention obvious. Miller simply mentions the use of the OUTER JOIN command of SQL to display text or results in a manner consistent with the definition of the use of the OUTER JOIN command of SQL. Applicant acknowledges that it is not the first user or the inventor of the OUTER JOIN command of SQL and that, indeed, the OUTER JOIN command of SQL will display data as described in Miller. However, nothing in Miller teaches or suggests a simplified testing and display procedure as claimed in the present invention whereby

the WITH and OUTER JOIN commands of SQL are combined to provide a simplified test method and display of test results. The Examiner has not pointed to any location in either of the references where there is a suggestion to modify the teachings thereof to achieve the present invention. The Examiner instead has found reference to certain terms, and asserts that since they exist, it would be obvious to combine them. Without the required suggestion to combine, it is improper for the Examiner to reject the claims under 35 U.S.C. §103.

Each of the pending claims contain the requirement that the novel testing process of the present invention utilize both the WITH and OUTER JOIN commands of SQL to perform their functions. Accordingly, it is submitted that the present invention patentably defines over Amado and Miller.

## 8. CONCLUSION

For the foregoing reasons applicants respectfully request this Board to overrule the Examiner's rejections and allow claims 1, 2, 4-9, 11-17, 19 and 20.

Respectfully submitted:

JUNE 1, 2005
Date

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## CLAIMS APPENDIX

**CLAIMS INVOLVED IN THIS APPEAL:**

1. (Previously presented) A method of systematically diagnosing data problems in a database, comprising the steps of:

identifying a set of tests to be performed on the database;

preparing a test program corresponding to the set of tests using SQL (Structured Query Language), wherein the preparing step is implemented using WITH and OUTER JOIN commands of SQL;

executing the test program on the database so that the set of tests are performed on the database simultaneously; and

automatically providing results of the test program in a predetermined format, whereby data problems in the data base can be diagnosed by viewing the results.

2. (Original) The method of claim 1, wherein the predetermined format is a table format.

3. (Canceled)

4. (Original) The method of claim 1, wherein at least one of the set of tests involves performing a test on a particular record stored in a table of the database, said record being identifiable by one or a combination of key values.

5. (Original) The method of claim 1, wherein, in the preparing step, the test program is prepared manually.

6. (Original) The method of claim 1, wherein, in the preparing step, the test program is prepared by computer software.

7. (Original) The method of claim 1, wherein the preparing step includes:

displaying a set of predetermined queries to a user;

receiving the user's response to each of the predetermined queries; and

preparing the test program based on the user's response.

8. (Previously presented) A system for systematically diagnosing data problems in a database, comprising:

a database including a plurality of tables, each table containing at least one row of data, each row identifiable by one or a combination of key values; and

a testing module, coupled to the database, for storing a test program written in SQL (Structured Query Language), wherein the test program includes WITH and OUTER JOIN commands of SQL, executing the test program on the database, and

automatically providing results of the test program in a predetermined format, wherein the test program corresponds to a collection of tests for diagnosing data problems in the database.

9. (Original) The system of claim 8, wherein the predetermined format is a table format.

10. (Canceled)

11. (Previously presented) The system of claim 8, wherein each of the collection of tests is represented by a query, and these queries are combined as a larger query using the WITH and OUTER JOIN commands.

12. (Original) The system of claim 8, wherein one of the collection of tests involves performing a test on a particular record stored in a table of the database, said record being identifiable by one or a combination of key values.

13. (Original) The system of claim 8, wherein the test program stored in the testing module is prepared manually.

14. (Original) The system of claim 8, wherein the test program stored in the testing module is prepared by computer software.

15. (Original) The system of claim 8, further comprising:

an interface for displaying a set of predetermined queries to a user and receiving the user's response to each of the predetermined queries,

wherein the test module prepares the test program based on the user's response.

16. (Previously presented) A computer program product embodied on computer readable media readable by a computing device, for systematically diagnosing data problems in a database, the product comprising computer executable instructions for:

identifying a set of tests to be performed on the database;

preparing a test program corresponding to the set of tests using SQL (structured query language), wherein the preparing instructions are performed using WITH and OUTER JOIN commands of SQL;

executing the test program on the database so that the set of tests are performed on the database simultaneously; and

automatically providing results of the test program in a predetermined format, whereby data problems in the data base can be diagnosed systematically.

17. (Original) The computer program product of claim 16, wherein the predetermined format is a table format.

18. (Canceled)

19. (Original) The computer program product of claim 16, wherein one of the set of tests involves performing a test on a particular record stored in a table of the database, said record being identifiable by one or a combination of key values.

20. (Original) The computer program product of claim 16, wherein the preparing instructions include computer executable instructions for:

displaying a set of predetermined queries to a user;

receiving the user's response to each of the predetermined queries; and

preparing the test program based on the user's response.